

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

**Office of Research and Development**

**Washington, D.C. 20460**



**ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM  
VERIFICATION STATEMENT**

<b>TECHNOLOGY TYPE:</b>	<b>PAINT OVERSPRAY ARRESTOR</b>		
<b>APPLICATION:</b>	<b>CONTROL OF PARTICLE EMISSIONS FROM AEROSPACE PAINT SPRAYING FACILITIES</b>		
<b>TECHNOLOGY NAME:</b>	<b>Purolator D95084415, DMK80-4404, and PB2424</b>		
<b>COMPANY:</b>	<b>Purolator Products Air Filtration Co.</b>		
<b>ADDRESS:</b>	<b>880 Facet Rd. Henderson, NC 27536</b>	<b>PHONE:</b>	<b>(252) 492-1141, x4201</b>
		<b>FAX:</b>	<b>(252) 492-6157</b>
<b>WEB SITE:</b>	<b>www.purolator.com</b>		
<b>EMAIL:</b>	<b>justtom@inet4u.com</b>		

**PROGRAM DESCRIPTION**

The U.S. Environmental Protection Agency (EPA) has created the Environmental Technology Verification (ETV) Program to facilitate the deployment of innovative or improved environmental technologies through performance verification and dissemination of information. The goal of the ETV Program is to further environmental protection by substantially accelerating the acceptance and use of improved and cost-effective technologies. ETV seeks to achieve this goal by providing high quality, peer reviewed data on technology performance to those involved in the design, distribution, financing, permitting, purchase, and use of environmental technologies.

ETV works in partnership with recognized standards and testing organizations, stakeholder groups which consist of buyers, vendor organizations and permittees, and with the full participation of individual technology developers. The program evaluates the performance of innovative technologies by developing test plans that are responsive to the needs of stakeholders, conducting field or laboratory tests (as appropriate), collecting and analyzing data, and preparing peer reviewed reports. All evaluations are conducted in accordance with rigorous quality assurance protocols to ensure that data of known and adequate quality are generated and that the results are defensible.

The Air Pollution Control Technology (APCT) program, one of 12 technology areas under ETV, is operated by the Research Triangle Institute (RTI), in cooperation with EPA's National Risk Management Research Laboratory. APCT has recently evaluated the performance of paint overspray arrestors used primarily in the aerospace industry. This verification statement provides a summary of the test results for the Purloator Products Air Filtration Company D95084415, DMK80-4404, and PB2424.

## VERIFICATION TEST DESCRIPTION

All tests were performed in accordance with the APCT “Generic Verification Protocol for Paint Overspray Arrestors.” The protocol incorporates all requirements of EPA Method 319: Determination of Filtration Efficiency for Paint Overspray Arrestors. [Method 319 is part of the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Aerospace Manufacturing and Rework Facilities and was published in the *Federal Register* on March 27, 1998 (40 CFR Part 63).] The protocol also includes requirements for quality management, quality assurance, procedures for product selection, auditing of the test laboratories, and test reporting format.

Filtration efficiency is computed from aerosol concentrations measured upstream and downstream of an arrestor installed in a laboratory test rig. The aerosol concentrations upstream and downstream of the arrestor are measured with an aerosol analyzer that simultaneously counts and sizes the particles in the aerosol stream. The aerosol analyzer covers the particle diameter size range from 0.3 to 10  $\mu\text{m}$  in a series of contiguous sizing channels. Each sizing channel covers a narrow range of particle diameters. By taking the ratio of the downstream to upstream counts on a channel by channel basis, the filtration efficiency is computed for each of the sizing channels.

The following series of tests were performed at a face velocity of 120 fpm (0.61 m/s):

- C Three arrestors were tested using a liquid-phase aerosol challenge,
- C Three arrestors were tested using a solid-phase aerosol challenge,
- C Six “no-filter” control tests (one performed prior to each arrestor test),
- C One high efficiency particulate air (HEPA) filter control test, and
- C One reference filter control test.

## TECHNOLOGY DESCRIPTION

The Purolator D95084415, DMK80-4404, and PB2424 arrestor system consists of three filters. The D95084415 is an eight-pocket bag filter with nominal dimensions of 24 x 24 x 15 in. (0.61 x 0.61 x 0.38 m). It has a metal frame, and the filter media is blue upstream and white downstream. Its label is white, ½ x 7 in. (1.27 x 17.8 cm) in size, and is affixed to the metal frame. The label includes the following information: Purolator Products Air Filtration Company, Model - D95084415K, Size - 24 x 24 x 15 in. (0.61 x 0.61 x 0.38 m), and an arrow indicating flow direction.

The DMK80-4404, Mark 80D, is a pleated panel filter with nominal dimensions of 24 x 24 x 4 in. (0.61 x 0.61 x 0.10 m). The filter media is blue with 22 pleats. Text imprinted on the cardboard frame includes the following information: Purolator Pleated Filter, Mark 80D, Medium Efficiency Panel Air Filter, Purolator Products Air Filtration Company, airflow direction, 24 x 24 x 4 in. (0.61 x 0.61 x 0.10 m) nominal size, 23 3/8 x 23 3/8 x 3 3/4 in. (0.59 x 0.59 x 0.095 m), exact size.

The PB2424, Prebond Pad, is a flat panel filter, with nominal dimensions of 25 x 25 x 2 in. (0.64 x 0.64 x 0.05 m). The media is white and tackified. The white, lightweight cardboard label, with a string attached, was 3 ½ x 6 ½ in. (8.9 x 16.5 cm) and stated Pre-bond Pad Part # PB2424. There is no label indication of the flow direction or filter orientation, so the industry standard orientation with the more porous side upstream was used.

## **VERIFICATION OF PERFORMANCE**

Verification testing of the arrestor was performed from March 29 through 31, 1999, at the test facilities of RTI. For ready comparison, the filtration efficiency requirements of the NESHAP are tabulated with the test results in Tables 1 through 4. The test results indicate that the tested arrestor exceeded the requirements listed in Tables 1 and 2 for existing sources and those listed in Tables 3 and 4 for new sources. The pressure drop across the tested arrestors at 120 fpm (0.61 m/s) ranged from 0.22 to 0.26 in. H<sub>2</sub>O (55 to 65 Pa) for the six arrestors tested.

The APCT quality assurance officer has reviewed the test results and the quality control data and has concluded that the data quality objectives given in the generic verification protocol have been attained.

This verification statement addresses two aspects of paint overspray arrestor performance: filtration efficiency and pressure drop. Users of this technology may wish to consider other performance parameters such as service life and cost when selecting a paint overspray arrestor for their use.

In accordance with the generic verification protocol, this verification report is valid for 12 months after the publication date 8/11/99.

**TABLE 1. EXISTING SOURCES\*:**  
**LIQUID-PHASE CHALLENGE AEROSOL PARTICLES**

<b>Aerodynamic particle diameter range, <math>\mu\text{m}</math></b>	<b>Filtration efficiency requirement, %</b>	<b>Filtration efficiency achieved, %</b>
> 5.7	> 90	>99
> 4.1	> 50	>99
> 2.2	> 10	>99

**TABLE 2. EXISTING SOURCES\*:**  
**SOLID-PHASE CHALLENGE AEROSOL PARTICLES**

<b>Aerodynamic particle diameter range, <math>\mu\text{m}</math></b>	<b>Filtration efficiency requirement, %</b>	<b>Filtration efficiency achieved, %</b>
> 8.1	> 90	>99
> 5.0	> 50	>99
> 2.6	> 10	>99

**TABLE 3. NEW SOURCES\*:**  
**LIQUID-PHASE CHALLENGE AEROSOL PARTICLES**

<b>Aerodynamic particle diameter range, <math>\mu\text{m}</math></b>	<b>Filtration efficiency requirement, %</b>	<b>Filtration efficiency achieved, %</b>
> 2.0	> 95	>99
> 1.0	> 80	97
> 0.42	> 65	90

**TABLE 4. NEW SOURCES\*:**  
**SOLID-PHASE CHALLENGE AEROSOL PARTICLES**

<b>Aerodynamic particle diameter range, <math>\mu\text{m}</math></b>	<b>Filtration efficiency requirement, %</b>	<b>Filtration efficiency achieved, %</b>
> 2.5	> 95	>99
> 1.1	> 85	99
> 0.70	> 75	98

\*A new source is any affected source that commenced construction after October 29, 1996.  
An existing source is any affected source that is not new.

*Original Signed By*  
*E. Timothy Oppelt*  
*7/27/99*

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E. Timothy Oppelt                      Date  
Director  
National Risk Management Research  
Laboratory  
Office of Research and Development  
United States Environmental  
Protection Agency

*Original Signed By*  
*Jack R. Farmer*  
*7/29/99*

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Jack R. Farmer                      Date  
Program Manager,  
Air Pollution Control Technology Program  
Research Triangle Institute

**NOTICE:** EPA verifications are based on an evaluation of technology performance under specific, predetermined criteria and the appropriate quality assurance procedures. EPA and RTI make no expressed or implied warranties as to the performance of the technology and do not certify that a technology will always operate as verified. The end user is solely responsible for complying with any and all applicable federal, state, and local requirements. Mention of commercial product names does not imply endorsement.

### **Availability of Verification Statement and Report**

Copies of the public Verification Statement and Verification Report are available from the following:

1.     **Research Triangle Institute**  
P.O. Box 12194  
Research Triangle Park, NC 27709-2194  
  
Web site: <http://etv.rti.org/apct/index.html>  
or <http://www.epa.gov/etv> (*click on partners*)
  
2.     **USEPA / APPCD**  
MD-4  
Research Triangle Park, NC 27711  
  
Web site: <http://www.epa.gov/etv/library.htm> (*electronic copy*)  
<http://www.epa.gov/ncepihom/>